LETTERS TO THE EDITOR.

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Australian Kinship.

IN a note which appeared in NATURE of April 1 *à propos* of my paper on terms for human relationships (British Academy), the writer suggested that our knowledge of Australian society was still very incomplete. Even as to Arunta rules and customs, he said, our informants differed greatly in their reports. There is now reason to suppose, however, that our informants, Messrs. Spencer and Gillen, and, later, the Rev. Mr. Strehlow, are not really at odds. The impression that they disagreed was caused by some letters of Mr. Strehlow in *Globus* and elsewhere; but now that he has published two parts of his "Die Arunta und Loritja-Stämme" (Frankfurt: Baer and Co., 1907, 1908), it becomes clear that he has merely studied branches of the Arunta "nation" not within the range of the work of Messrs. Spencer and Gillen, and that his natives differ, not only in customs and beliefs, but more or less in language, from those of the English explorers.

The differences are matters of detail; the broad outlines of custom and myth are identical. I ventured to express this opinion in *Man*, and was confirmed in my view by finding that it is held by Mr. N. W. Thomas ("Folk-Lore," March 30, 1909). He writes that Mr. Strehlow's second volume "confirms the belief that local differences of considerable magnitude exist, not only in belief, but also in social organisation."

In all probability both Messrs. Spencer and Gillen and Mr. Strehlow are right as regards the natives whom they have studied. Mr. Strehlow's full knowledge of the languages or dialects makes his book "masterly," as Mr. Thomas says, but the book does not invalidate the results of the English inquirers. An English translation would save trouble to readers in this country who are not too familiar with German.

A. LANG.

Forms, Markings, and Attitudes in Animal and Plant Life.

THE object of this letter is to suggest what I may call a collateral theory of mimicry, and not in any sense a complete theory. It is based upon facts or groups of facts, many of which are very well known, but all of which have passed under my own observation.

Notwithstanding the great variety of form in leaves, there is general agreement as to the primary character of a simple ovate leaf, and the bi-facial form of the leaf is in obvious correlation with the great functions of transpiration and assimilation. The bi-facial leaf-like form of the leaf-insect (Phyllium) is not in correlation with any such essential metabolic functions, but it is correlated with the mode of life of the insect. The expression "mode of life" is sufficiently vague; it represents the combination of physiological reactions which make up the outward life of the animal. What these reactions are cannot always be stated in precise language, and until they can be so stated our knowledge has not advanced very much in regard to a particular case.

The cryptozoic habit of so many animals is the expression of reactions which may be conveniently classified together under the term cryptotaxis. Thus the concealment afforded by protective resemblance is one example of this general tendency; living under logs, or bark, or below the surface of the ground is another. Prof. Loeb, as I understand him, has attempted to throw discredit on this tendency in so far as he reduces it to a manifestation of stereotropism ("The Dynamics of Living Matter," 1906, p. 157); but stereotropism may, and obviously does, coexist with cryptotaxis, as may be verified any day in the behaviour of snakes, land-leeches, and land-planarians.

The leaf-butterfly (Kallima) also admirably lives up to its name, but in a different sense; for, whereas Phyllium has a dorsoventrally flattened body, Kallima has a normal body, and resembles a leaf only when at rest with closed wings. The pupa of another butterfly, *Troides darsius*, resembles a crumpled yellow leaf; but it is not only amongst insects that we find leaf resemblances. It occurs also amongst fishes. Besides the extraordinary case of Phyllopteryx, the young sea-bat (*Platax vespertilio*) resembles a simple yellow leaf, the dorsal, ventral, and anal fins assisting to form the contour line, while the caudal fin is glass-clear (*Spolia Zeylanica*, ii., 1905, p. 51). Drifting yellow leaves which have fallen from mangroves and other maritime trees are common enough in the sea and backwaters.

Animals which resemble the same thing resemble one another; but whereas the resemblance of a leaf-fish (Platax) to a leaf is a real resemblance, advantageous to the fish, its resemblance to a leaf-butterfly is accidental, and of no value to either. The important fact is their common possession of a fundamental form, namely, that of a leaf.

Of other forms which are widely distributed amongst different families, orders, and even classes, I may mention the ant-form and the tadpole-form, without going into further particulars.

With equal brevity allusion may be made to familiar markings, widely distributed without reference to mutual resemblances, but conforming to common physiological reactions. Such, for example, are longitudinal stripes or bands, transverse bars or rings, bright spots on a dark ground, dark spots on a pale ground, &c. In all such cases I suggest that the primary fact is the conformity to a fundamental pattern, which is itself the expression of a pigment-reaction, the causes of which have not yet been reduced to a definition. Any advantage which this conformity to a common standard may confer is a secondary factor which may conduce to the preservation of the species by natural selection.

Lastly, with regard to attitudes there is much to be said, but I must be brief. One of the most telling examples of general conformity of attitude is the bi-pedal posture of all birds, some reptiles, and many mammals.

The little palm-squirrels (Funambulus) and tree-lizards (Calotes) are often seen associated together on the same tree, and it is therefore the more noticeable that they have in common a singular habit of remaining in one spot with the fore-body somewhat raised, and then jerking the fore-body up and down several times in rapid succession whilst clinging to the trunk or branch of a tree. I do not know what the precise significance of this bobbing movement may be, but they both practise it.

The only other attitude which I desire to mention is the vertical attitude assumed by some fishes. Some years ago I described and published an ideal picture of the vertical swimming attitude of *Amphisile strigata* (Zoological Results, part vi., 1902, p. 719). More recently the late Mr. W. Saville Kent told me that he had seen the same thing, and had kept the fish in an aquarium, whereas I had only seen it from a boat, swimming in a small shoal in the sea. I was glad of the confirmation of the vertical attitude; but upon showing my figure to Mr. Saville Kent, he pointed out to me that the head is not directed upwards, as there represented, but downwards, as if to feed from the bottom. What I saw were swimming in mid-water, and as the body has a pronounced amphioxine form, it was impossible to be certain which end was uppermost. This uncommon vertical attitude, with head directed downwards, is not without parallel amongst fishes, having been observed by Dr. Abbott in the case of the "mud sunfish" (*Acantharchus pomotis*) in 1884.

ARTHUR WILLEY.

Colombo, Ceylon, April 4.

The Simple Equivalent of an Alternating Circuit of Parallel Wires.

IN NATURE of January 30, 1908, some results were quoted by me with reference to the effective inductance of two long parallel wires when the change of current distribution due to frequency is taken into account. These were extended later (*Phil. Mag.*, February, 1909) to meet the case in which the wires are very close together. Pending more detailed publication, the following developments and extensions may be of interest from the practical point of view, as they do not require the construction of special

tables, but may be used as they stand. The system of formulæ determines the simple equivalent of the two wires, copper or iron, when their capacity is sufficiently small to be left out of account. One wire is the return of the other, and they are equal in all respects.

Let (a, μ, σ) be the radius, permeability, and resistivity of a wire in C.G.S. units, f the frequency of alternation, and c the distance between the axes of the wires.

Writing

$$\lambda = 4\pi a(\mu f/\sigma)^{\frac{1}{2}}, \quad \rho = \log_e(\tfrac{2}{3}\pi f a . 10^{-10}).$$

Then

(*a*) For copper wires, provided $\lambda > 11$, so that the frequency is high, if (L, R) be the inductance and resistance per unit length of the pair,

$$L = 4\left(1 - \frac{a^2}{\rho c^2}\right)\log_e\frac{c}{a} + \frac{4}{\lambda}\left(1 - \frac{2}{\lambda}\right) - \frac{4a^2}{\lambda c^2\rho^2}\left(\rho - \overline{4\rho + 3}\log_e\frac{c}{a}\right)$$

$$\frac{R}{8\pi f} = \frac{1}{\lambda}\left(1 + \frac{1}{\lambda}\right) - \frac{a^2}{\lambda c^2\rho^2}\left(\rho - \overline{2\rho - 1}\log_e\frac{c}{a}\right) + \frac{a^2}{\lambda^2 c^2\rho^3}\left\{\rho^2 - \overline{2 - 3\rho + 2\rho^2}\log_e\frac{c}{a}\right\}$$

where λ^{-3}, a^4/c^4, and $a^2/\lambda^3c^2\rho$ have been neglected.

(*b*) For iron wires, ignoring also $\mu\lambda^{-3}$ and μ^{-3},

$$L = 4\left(\log_e\frac{c}{a} - \frac{a^2}{c^2}\right) + \frac{4}{\lambda}\left(1 - \frac{2}{\lambda}\right) - \frac{2a^2}{\mu c^2}\left(\lambda - 1\right)\left(\rho - 2 + \log_e\frac{c}{a}\right)$$

$$\frac{R}{4\pi f} = \frac{2\mu}{\lambda}\left(1 + \frac{1}{\lambda} + \frac{3}{4\lambda^2}\right) - \frac{a^2\lambda}{\mu c^2}\left(2 - \rho - \log_e\frac{c}{a}\right) + \frac{a^2\lambda^2}{c^2\mu^2}\left(4\rho - 2 - \rho^2 - \rho\log_e\frac{c}{a}\right)$$

(*c*) For copper wires with low frequency,

$$L = 4\log_e\frac{c}{a} + \frac{2\beta}{\alpha z} + \frac{4a^2}{c^2D}\left(1 - 2\beta\rho z - \frac{\gamma}{z}\right) - \frac{8a^2}{c^2D}\left(2\alpha\rho z^2 - 2\alpha\rho\gamma z - \beta z + 2\beta\gamma\right)\log_e\frac{c}{a}$$

$$\frac{R}{8\pi f} = \frac{\gamma}{\alpha z} - \frac{2a^2}{zc^2D}\left(\beta - 2\alpha\rho z + 2\gamma\rho z^2\right) + \frac{4a^2}{c^2D}\log\frac{c}{a}\left(\gamma^2 - \beta^2 \quad \gamma z + 2\alpha\beta\rho z\right)$$

where

$$D = 1 - 4\beta\rho z + 4\alpha\rho^2 z^2, \quad 2z\sqrt{2} = \lambda,$$

$$\alpha z^{-2} = 1 - \frac{5}{12}z^4 + \frac{143}{720}z^8 . \; 2\beta z^{-3} = 1 - \frac{11}{24}z^4 + \frac{473}{2160}z^8$$

$$\gamma z^{-1} = 1 - \frac{1}{3}z^4 + \frac{19}{120}z^8$$

and z^{12}, a^4/c^4 have been ignored.

(*d*) For iron wires under the same conditions, neglecting also μ^{-2} and a^2z^8/c^2,

$$L = 4\log_e\frac{c}{a} - 4\frac{a^2}{c^2} + 1 - \frac{z^4}{24} + \frac{13z^8}{4320} - \frac{4a^2z^4}{\mu c^2}\left(\rho + \log_e\frac{c}{a}\right) + \frac{8a^2}{\mu c^2}\left(1 + \frac{1}{6}z^4\right)$$

$$\frac{R}{4\pi f} = \frac{\mu}{z^2}\left(1 \quad \frac{1}{12}z^4 - \frac{1}{180}z^8\right) - \frac{4a^2z^2}{\mu c^2}\left(1 \quad \frac{z^4}{24}\right) + \frac{4a^2z^2}{\mu c^2}\left(\rho + \log_e\frac{c}{a}\right)\left(1 - \frac{1}{3}z^4\right)$$

The results above appear to be capable of including all important practical cases in which the condition of small capacity is not violated. This condition restricts the length of the wires.

For a four-figure accuracy, the capacity must in general satisfy the two conditions

$$C \not> (3fl^2)^{-1}10^{-3}$$
$$C \not> (6Lf^2l^2)^{-1}10^{-4}$$

where C is the capacity per unit length and l is the length of either wire. For a capacity of a microfarad per kilometre $C = 10^{-20}$.

J. W. NICHOLSON.

Trinity College, Cambridge, April 21.

Gigantocypris and the "Challenger."

THE writer of the note on "Some Marine and Freshwater Organisms" (NATURE, April 8) quotes from Herr Lüders (*Zeitschr. wiss. Zool.*, xcii., [1], p. 103, 1909) the statement that the giant Ostracod Gigantocypris was first obtained by the *Challenger* Expedition. It may perhaps be worth while to point out that this statement has no foundation in fact. It was first made in 1895 by Dr. G. W. Müller (Bull. Mus. Comp. Zool. Harvard, xxvii., p. 165), who quotes a passage from the "Challenger-Briefe" of R. v. Willemoes Suhm (*Zeitschr. wiss. Zool.*, xxiv., p. 13, 1874), where it is stated that the *Challenger* dredged between Prince Edward Island and the Crozets a fragmentary specimen of a gigantic Ostracod. Dr. Müller suggests that this may have been a Gigantocypris, and he continues:—"Leider fehlen nähere Angaben über das Thier, und in den Challengerostracoden ist es nicht erwähnt." Herr Lüders, in his recent paper, accepts the identification, and echoes the lament. As a matter of fact, the specimen described by Willemoes Suhm is still safely preserved in the British Museum, but it is not an Ostracod at all! Long before Müller conjectured that it might be a Gigantocypris, Prof. G. O. Sars had described and figured it as one of the two co-types of the remarkable phyllocarid crustacean *Nebaliopsis typica* (Rep. Phyllocarida *Challenger*, p. 22, 1887). Prof. Sars says:—"It is apparently this form that was mentioned by the late Dr. v. Willemoes Suhm in a letter to Prof. v. Siebold as a gigantic Ostracode. This strange mistake may be readily explained by the incompleteness of the first specimen obtained, of which only the carapace and a small fragment of the body was brought up in the dredge." The statement might have been made still more emphatic. The description and the dimensions given by Willemoes Suhm, as well as the locality, put it beyond doubt that he was speaking of the identical specimen which is figured on Plate III., Fig. 5, of Prof. Sars's report.

W. T. CALMAN.

British Museum (Natural History), Cromwell Road, S.W., April 15.

Persistent Trail of a Meteor on March 14.

I RECENTLY sent the Cape Astronomer Royal an account of an unusual meteor which I saw, and he has suggested that I forward an account to you.

On the evening of March 14 I was walking along the sea-shore looking south-west; the sun had set, and the sky was still bright with sunlight. A few clouds were slowly drifting from the south-east, when suddenly, about 7.45 p.m., I saw what looked like a large rocket dart from behind a cloud, rush across the sky from west to east, and disappear over the Table Mountain range in the direction of False Bay. The track of the meteor was shown by a brilliant, apparently glowing, streak of silvery light, which remained stationary in the sky like a long ribbon of fire for fully ten minutes. The "tail" then gradually assumed a wavy form, and slowly faded out of sight. The peculiarity consisted in the persistence of the "tail" or track of the meteor, as I suppose it was. On looking into Sir Robert Ball's book, "The Story of the Heavens," I find an account strangely akin to mine, and I should like to know the reason for the persistence of the luminous track, which must have been very bright to have shown so plainly against the sun-lit sky. Our southern skies are wonderfully brilliant, owing, doubtless, to the clearness of our air; and I have often seen meteors flash across the sky, but never before have I seen such a magnificent display as that described above.

EDWARD J. STEER.

Box 42, Cape Town, March 22.

Lignum Nephriticum.

I MUST thank Mr. Benham for directing attention (April 8) to the early observations of Boyle quoted by Faraday. I have erred in good company; Stokes himself was apparently unaware of Boyle's experiment, and the "Optics" of Basset, Glazebrook, Preston, Tait, and Winkelmann all seem to regard Brewster and Herschel as the first discoverers of fluorescence.

Dr. Stapf's letter in NATURE of April 22 confirms the conclusions of a recent correspondence in the *Gardeners' Chronicle*; letters of March 20 and April 3 give reasons for assigning *Lignum Nephriticum* to a Mexican tree known as Coatli or Tlapalcypatli.

JOHN H. SHAXBY.

University College of South Wales and Monmouthshire, Cardiff, April 23.